

DISTURBANCES IN SOUTHERN WATERS DURING THE HURRICANE SEASON OF 1922.

By W. P. DAY.

Air pressure was abnormally high in the region of the subpermanent north Atlantic anticyclone during the forepart of the hurricane season (including August) with a tendency to displace the line of discontinuity between the two trade-wind systems (along which these storms develop) to a more southern latitude. This may possibly account for the fact that only two, or possibly three, typical hurricanes were noted in Atlantic waters, while the unusual number of five were encountered in the Pacific to the south and west of the Mexican coast. The latter have been charted and described by Mr. Willis E. Hurd of the Marine Division in an unpublished manuscript entitled "Tropical Storms of the Eastern North Pacific Ocean." At least two of the storms charted by Hurd can be connected with disturbances moving westward over the extreme southern Caribbean.

On June 12 disturbed conditions were noted over the western Caribbean. Moving northwest across the Yucatan Peninsula, the disturbance gained considerable intensity and the characteristics of a developing hurricane in the southwestern Gulf of Mexico. A further increase in intensity was prevented by its passage inland on the Mexican coast between Tampico and the mouth of the Rio Grande, but not without first causing unusually heavy rains over the lower Rio Grande Valley. (Consult also Chart XII at back of this REVIEW.)

After a long period of relative quiet a series of disturbances had their beginning about August 23. Unsettled conditions were noted in the extreme southern Caribbean just north of Panama, then rains in Central America and southern Mexico, and finally a hurricane was noted by Hurd in the Pacific Ocean on the 27th near lat. 15° N. and long. 100° W. (lowest reported barometer reading 29.31 inches). The next of this series was noted as a disturbance over the western Caribbean on the 26th, and moved slowly across Central America and along the extreme Mexican coast. This was also charted by Hurd on September 1 near lat. 17° N. and long. 103° W., having developed hurricane intensity over the Pacific Ocean (lowest reported barometer reading 29.35 inches). Hurd also describes a very formidable hurricane in the vicinity of the Revillo Gigedo Islands, reported by the S. S. *Bessemer City*, on the 9th and 10th of September (lowest reported barometer reading 27.96 inches).

The next period began with the reporting of a fully developed hurricane to the east of the Windward Islands. Moving northwest, this storm passed near Barbuda of the Leeward group on the morning of the 16th of September (lowest barometer reading 28.58 inches). After recurving the hurricane passed near Bermuda on the morning of the 21st (lowest barometer reading 28.57 inches), continued northeastward into the steamer lanes and was encountered by a large number of vessels before reaching the English coast in a modified form. From a very intense storm of small diameter, which was noted at Barbuda and Bermuda, the storm enlarged its area enormously in the northern latitudes and retained much of its vortical energy. A most unusual condition prevailed while this storm was recurving in the vicinity of Bermuda. A very severe Atlantic coast storm developed in the Gulf of Charleston in connection with an area of high barometric pressure over the Lake region and the New

England States, reached its greatest intensity off Hatteras on the 20th and 21st, and died out with the dissipation of the northern high-pressure area. This storm was not a hurricane, though winds of near hurricane force were reported on its northern quarter, where the isobars were constricted. No barometer readings lower than 29.50 inches were reported, and, in fact, there was no unusual gradient near the center. The astonishing thing is in the coexistence of this large extra-tropical cyclone with the almost minute (comparatively) but extremely intense hurricane on its eastern periphery, the subsequent filling up of the coast storm, and the enormous expansion of the hurricane.

Unsettled weather prevailed over the Gulf of Mexico and the western Caribbean during much of the month of October. Several disturbances were charted within this area, but only one attained hurricane intensity or characteristics. The first of these was noted as a slight disturbance in the northwestern Caribbean on the 12th and moved northwest and north without gaining any great intensity, a sort of abortive hurricane, passing inland on the Gulf coast between Mobile and Pensacola on the 17th. On the 14th, falling barometer, wind shifts, and squally weather were reported by a vessel immediately southwest of Jamaica. In contrast to the preceding disturbance, this storm developed rapidly both in intensity and area, becoming a severe hurricane by the 16th. Moving at first west-northwest it crossed the Yucatan Peninsula, was deflected to the southwest by rising pressure on its northwestern quarter, and was last charted on the 21st, decreased in energy and modified in form after its passage across land areas, in the vicinity of Frontera in the Province of Tabasco, Mexico. Hurd has charted a hurricane near Cape San Lucas in the Pacific on the 15th of the month, which may belong to this last series.

CYCLONE OF THE ARABIAN SEA.

On the 2d to 5th of December, 1922, a tropical cyclone of considerable intensity traversed the Arabian Sea. The American S. S. *Eclipse*, Capt. M. Hawkins, encountered the full force of its storm winds. He said: "I did not realize that it was a revolving storm until after 4 p. m., December 2, as it had all the usual squally weather and conditions that are experienced before getting into the NE. monsoon." The *Eclipse* was then near latitude 9° 48' N., longitude 70° E., with wind NE. x E., force 9, pressure 29.34 inches. Four hours later, in latitude 9° 50' N., longitude 69° 20' E., the vessel was in a NNE. hurricane, pressure 28.20 inches. From 8:05 p. m. until 8:30 p. m. it was in the storm center, with light airs. From 8:30 p. m. until 8:55 p. m. hurricane winds from the south were experienced, during which time the pressure rose from an observed minimum of 28.20 inches to 29.00 inches. The storm then receded rapidly.

On December 5 the American S. S. *Algic*, Capt. Charles Olsen, Port Said toward Bombay, was slightly involved in this storm in latitude 15° 42' N., longitude 57° 18' E. This vessel reported a steady NE. gale, highest force 7, lowest pressure 29.84 inches; also a heavy SE. swell which continued for about 20 hours after the cessation of the NE. wind. Bombay at this time reported the cyclone to be in about 16° N., 64° E., moving WNW. or dissipating.—W. E. Hurd.